

Local adaptation to climate change assessing vulnerabilities and finding solutions at Port Susan Bay

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The Nature
Conservancy. 
Protecting nature. Preserving life.

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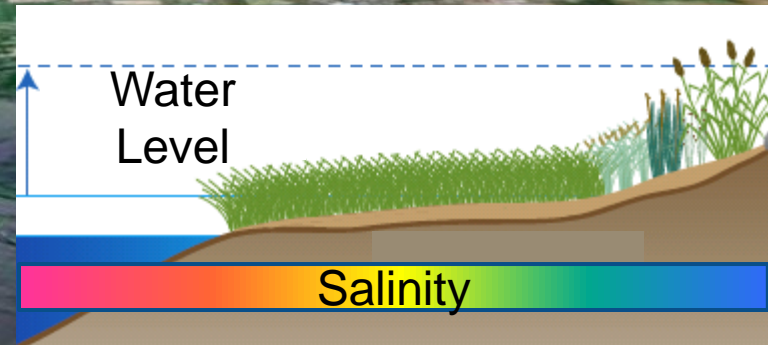
What affects estuary habitat resilience?

- Water level

- *Topography*
- *Sediment*
- *River flow*
- *Tides*
- *Storms*

- Salinity

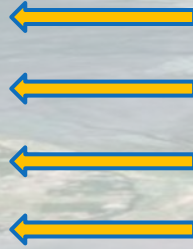
- *River flow*
- *Tides*



What affects community vulnerability?

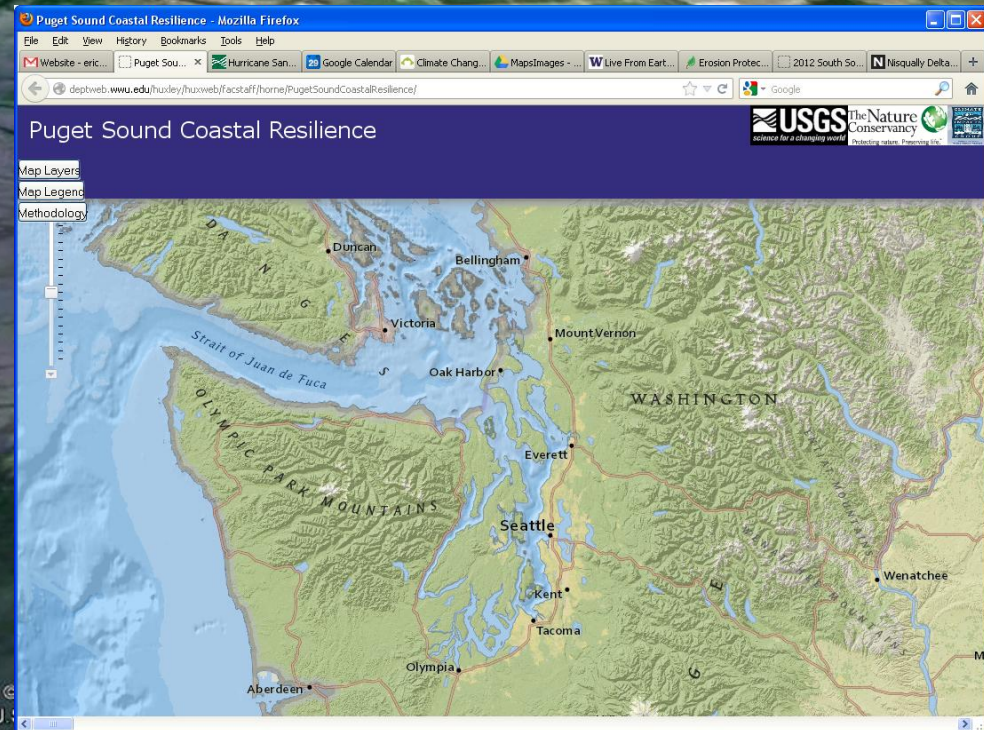
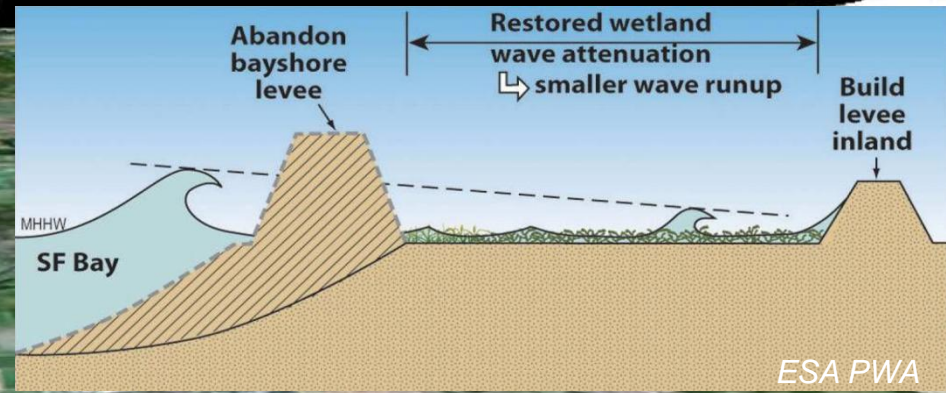
- Water level

- *Topography*
- *Sediment*
- *River flow*
- *Tides*
- *Storms*



- Protective infrastructure

- *Grey*
- *Green*



Habitats and Communities are Linked Systems

Community and habitat vulnerability need to be evaluated together

A mix of green-grey solutions are possible, and necessary

Look for strategies that have multiple benefits

Image © 2012 TerraMetrics
Image U.S. Geological Survey
© 2012 Cnes/Spot Image

Google earth

Port Susan Bay

Using simple models
to identify vulnerabilities
and find solutions

*Port Susan Bay
Stillaguamish
River*



Marshes on the Move

A Manager's Guide to Understanding and Using
Model Results Depicting Potential Impacts
of Sea Level Rise on Coastal Wetlands

www.coastalresilience.org
www.csc.noaa.gov/digitalcoast

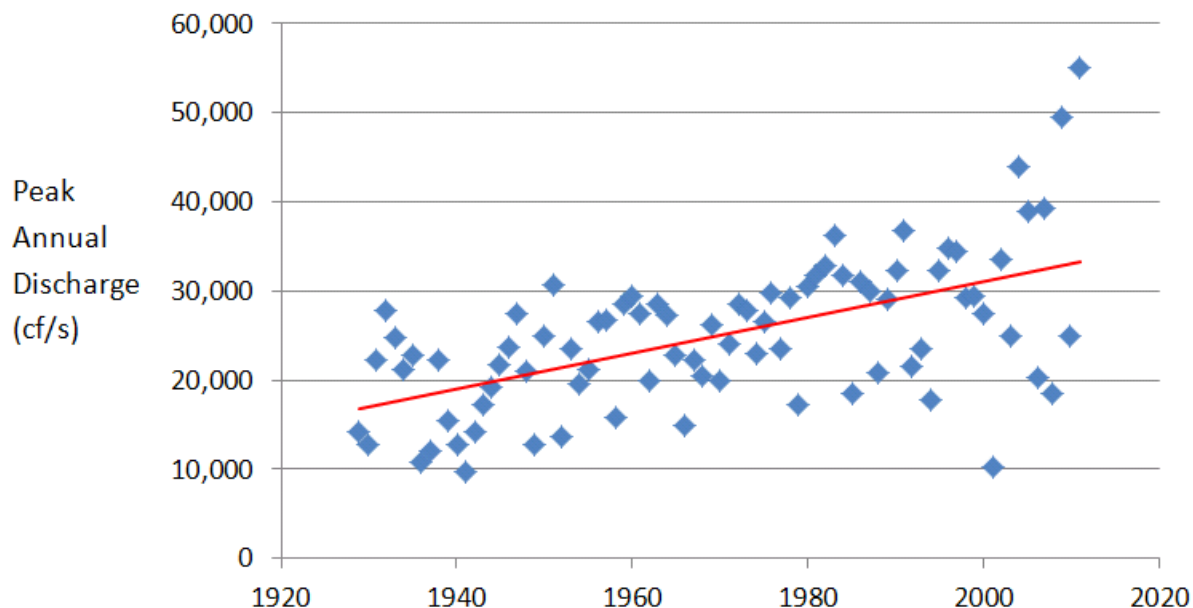


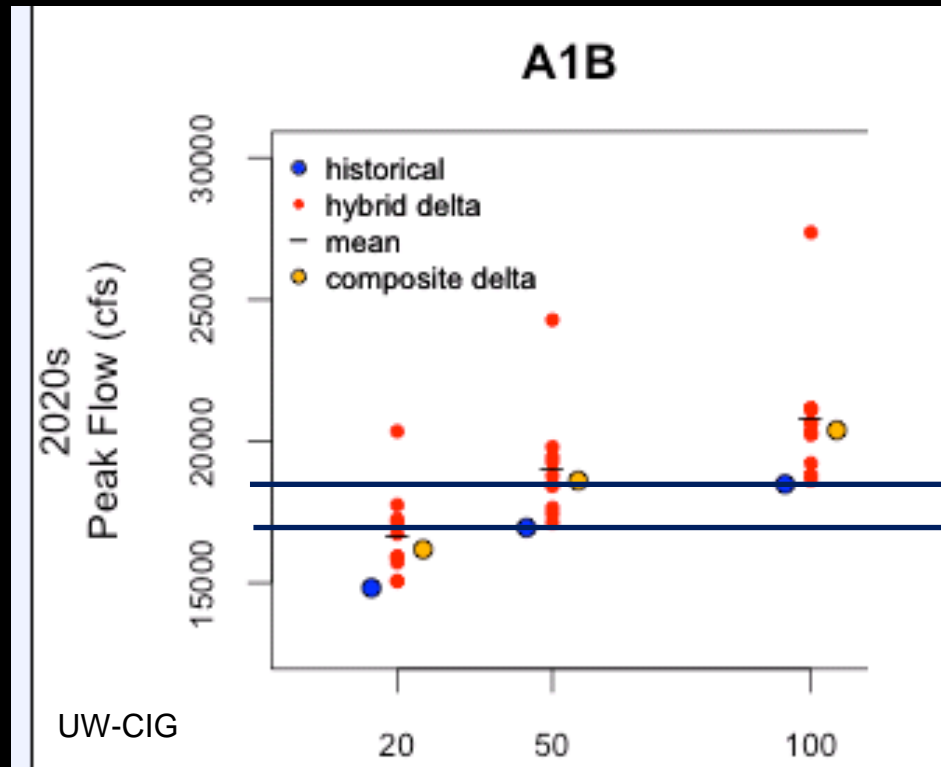
NOAA Coastal Services Center
LINKING PEOPLE, INFORMATION, AND TECHNOLOGY

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Stillaguamish Annual Peak Flows





Port Susan Bay

Coastal Storm Risk



January 5, 2010

High Tide plus light breeze
from the north



Breached Dike

February 4, 2006

High Tide plus 44 knot
wind from the south

Port Susan Bay

Coastal Storm Risk

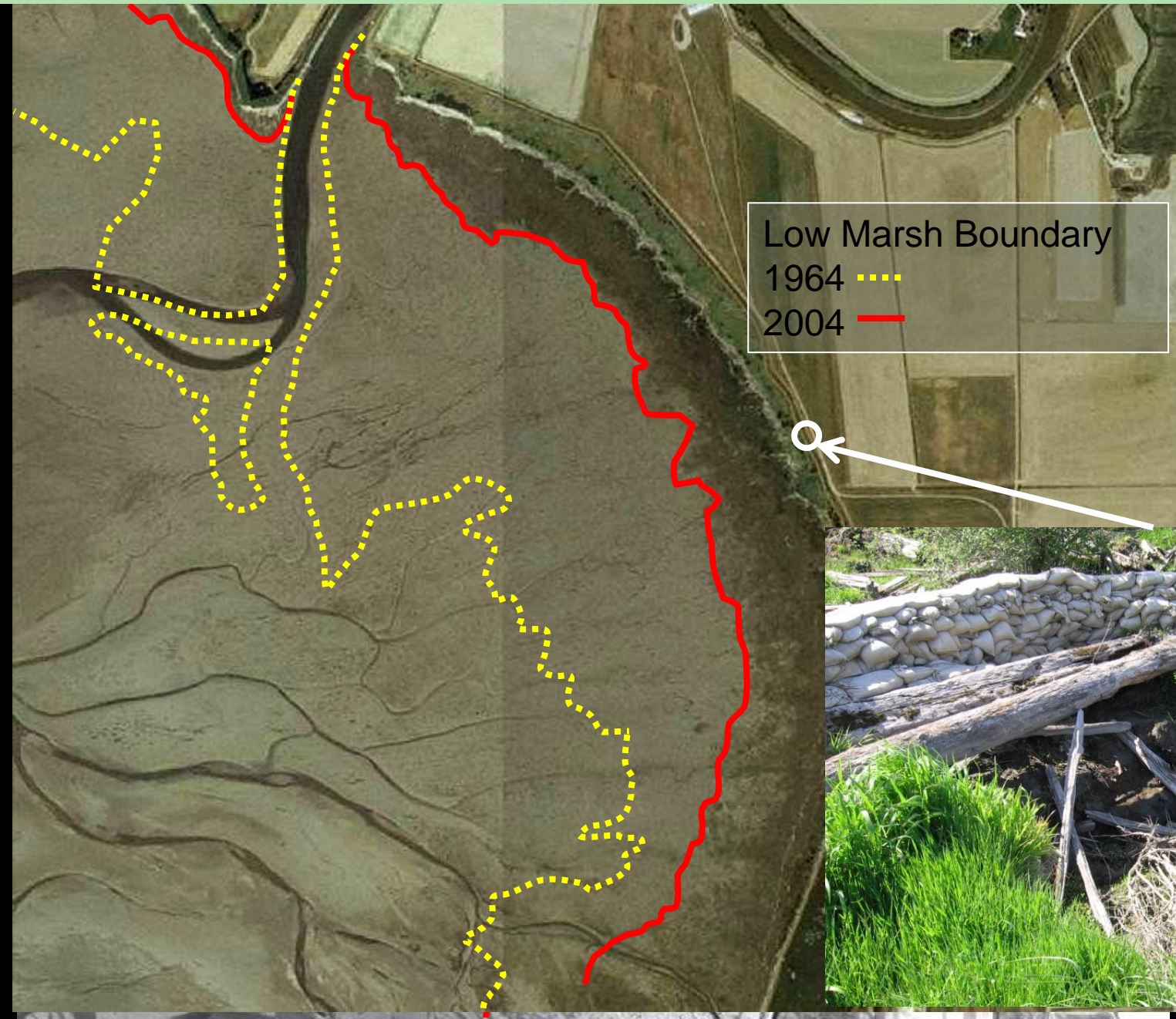
Puget Sound sea levels are projected to rise ~ 24" by 2100 (NAS 2012)



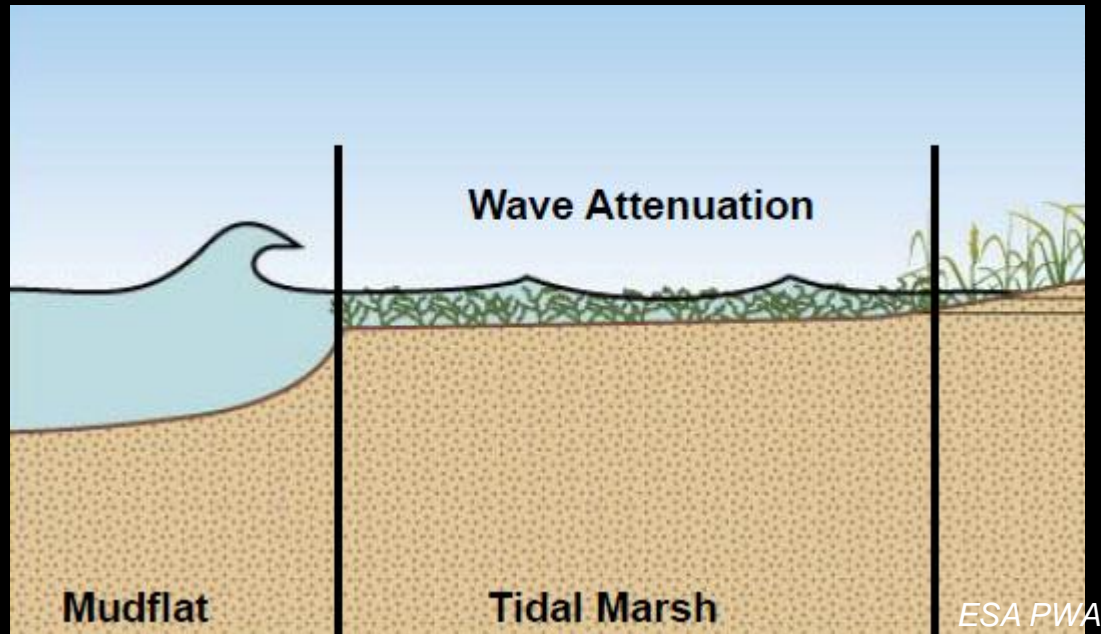
12" of SLR turns a 100-year coastal flood into a 10-year event

24" of SLR turns a 100-year coastal flood into an **annual** event

Green and Grey Infrastructure are Linked

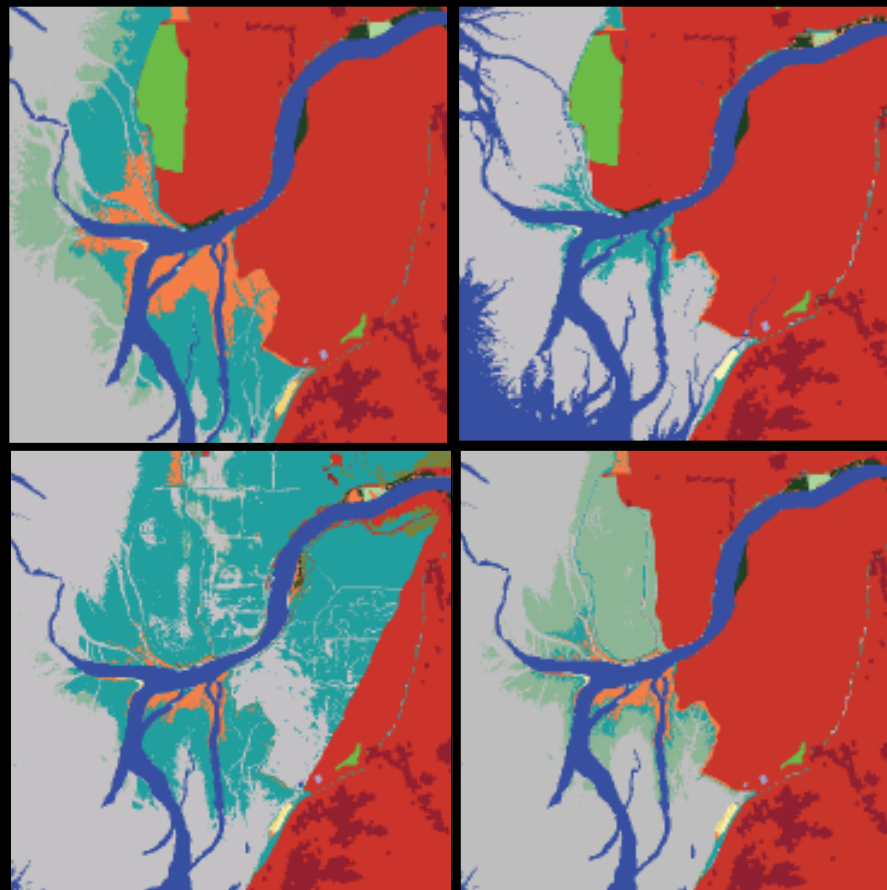
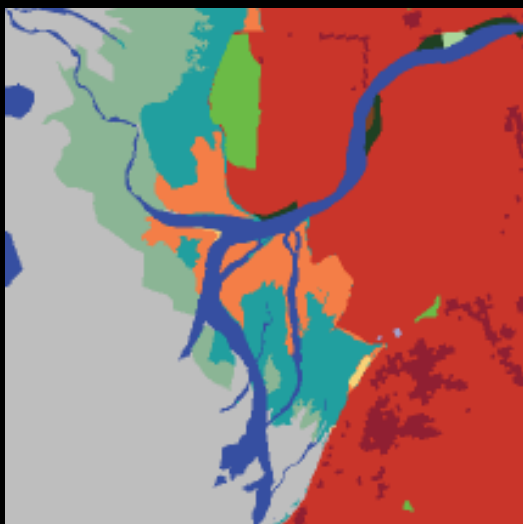


Green and Grey Infrastructure are Linked



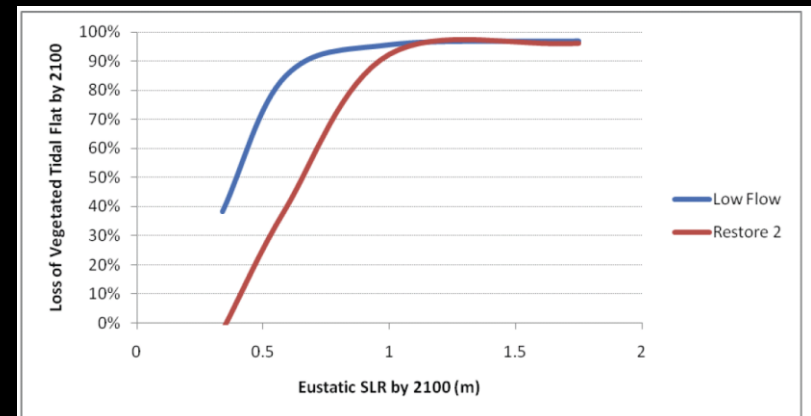
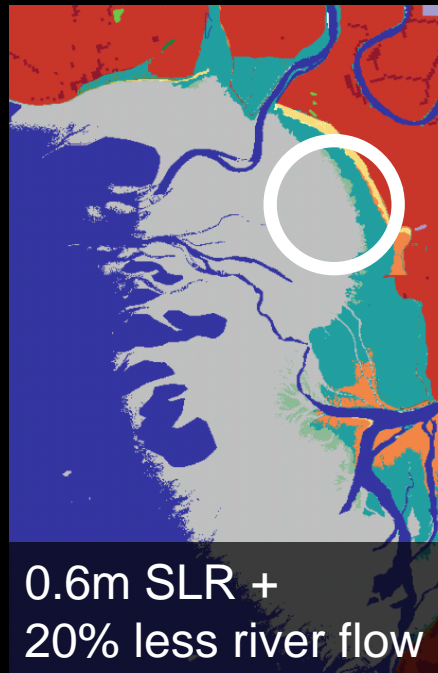
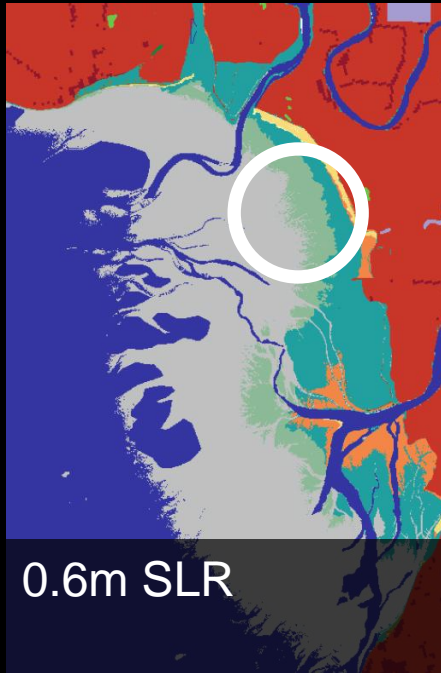
Port Susan Bay

Using simple models to
identify vulnerabilities
and solutions



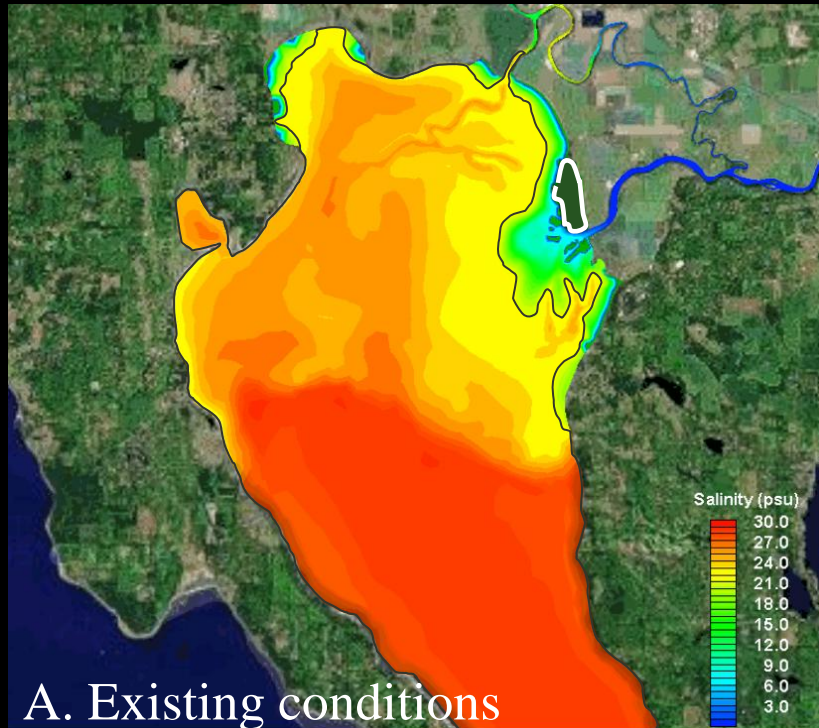
- Sea level rise
- Accretion rates
- Freshwater flows (salinity)
- Restoration alternatives
- Surprises (snow geese)
- Etc.

Salinity Vulnerability

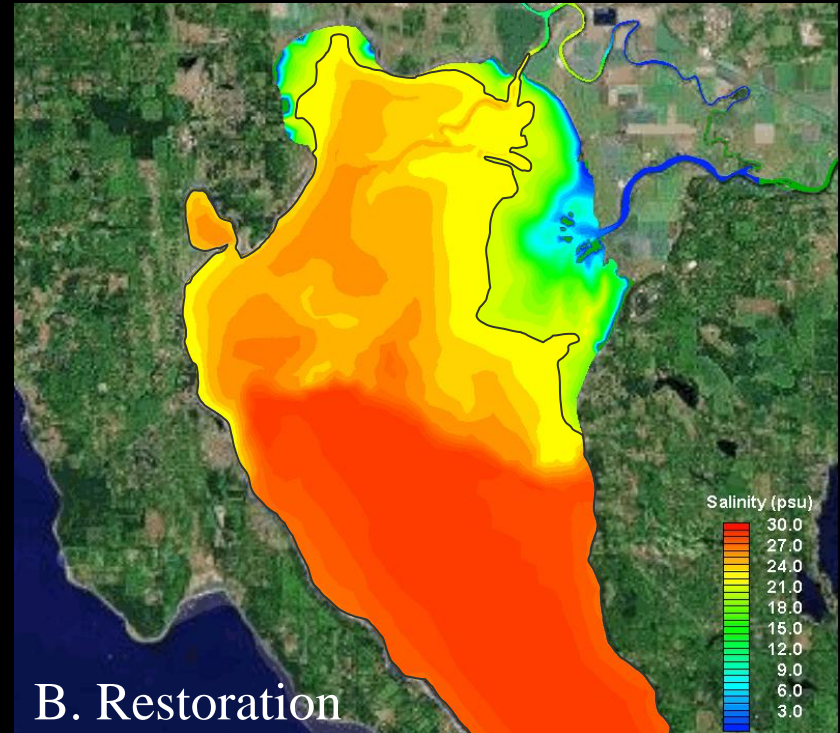


Salinity vulnerability

Management Choices



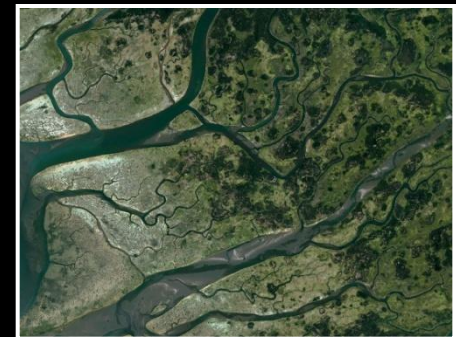
A. Existing conditions



B. Restoration

Community Dynamics

Conflicts Over Natural Resources



Finding Common Ground: Community Resilience

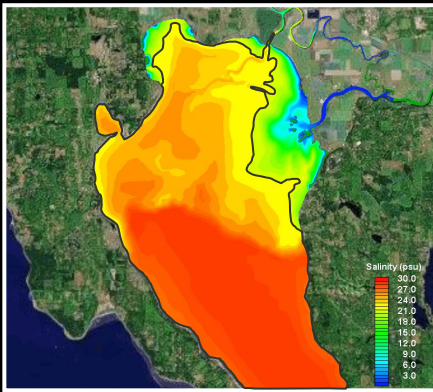
Intersecting interests = multiple benefit strategies



Restoration Project Objectives – Multiple Benefits



- **Restore tidal marsh for fish and birds**



- **Increase resilience in broader system**
- **Reduce flood risk by improving both green and grey infrastructure**



Adapting to Climate Change: How to be an “early adopter”

Focus on Community Resilience

*provides the common ground that brings all interests to the table in
search of multiple benefit strategies*



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Thanks!

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